



# झारखण्ड गजट

## असाधारण अंक

### झारखण्ड सरकार द्वारा प्रकाशित

संख्या 425 राँची, बुधवार

27 ज्येष्ठ, 1937 (श०)

17 जून, 2015 (ई०)

#### जल संसाधन विभाग

-----

संकल्प

16 सितम्बर, 2014

**विषय:-** रेलवे को प्रभावित करनेवाले कार्यों के संबंध में झारखंड राज्य में व्यापक रूप से लागू होनेवाले मैनुअल को अंगीकार करने के संबंध में।

**संख्या-1/पी0एम0सी0/विविध/179/2005-1273--** सरकार के विभिन्न कार्य विभागों/ लोक उपक्रमों के द्वारा सिंचाई, बाढ़ नियंत्रण, ऊर्जा, पथ परिवहन, जलापूर्ति इत्यादि के लिए डैम, जलाशय, सड़क, पानी के टैंक, बाढ़ सुरक्षात्मक तटबंध, नहर इत्यादि का निर्माण किया जाता है, जो नदियों के प्राकृतिक बहाव को परिवर्तित या संकुचित करते हैं। इसके परिणामस्वरूप इनके अधोधार में पड़नेवाले रेलवे लाईन को खतरा उत्पन्न हो सकता है। ऐसे ही कार्यों को Railway Affecting Works के नाम से जाना जाता है। रेलवे को प्रभावित करने वाले कार्यों का सफल संचालन विभिन्न संस्थाओं यथा पब्लिक वर्क्स, सिंचाई एवं भू-राजस्व विभागों द्वारा कराया जाता है। इसलिए ऐसा महसूस किया गया है कि ऐसे कार्यों के रख-रखाव के प्रति जवाबदेही के लिए एक समेकित प्रक्रिया पर विचार किया जाय जो रेलवे ट्रैक एवं उससे यात्रा करने वाले यात्रियों की सुरक्षा सुनिश्चित कर सके।

2. महाप्रबंधक (अभियंत्रण) दक्षिण-पूर्वी रेलवे द्वारा राज्य के अधीन रेल संरचनाओं एवं झारखंड सरकार के विभिन्न विभागों के अधीन कराए जा रहे निर्माण कार्यों में समन्वय के लिए अभियंताओं की राज्य स्तरीय समिति (State Committee of Engineers) का गठन किया गया।

जिसका संशोधित स्वरूप निम्नवत निर्धारित किया गया है।

(i)	प्रधान सचिव, जल संसाधन विभाग, राँची	- अध्यक्ष
(ii)	अभियंता प्रमुख -I , जल संसाधन विभाग, राँची	- सदस्य
(iii)	मुख्य अभियंता, रूपांकण, समग्र योजना एवं जल विज्ञान, जगन्नाथपुर हाई स्कूल, धुर्वा, राँची।	- सदस्य
(iv)	मुख्य अभियंता, ग्रामीण कार्य विभाग, राँची।	- सदस्य
(v)	मुख्य अभियंता, पथ निर्माण विभाग, राँची।	- सदस्य
(vi)	अभियंता प्रमुख, पेय जल एवं स्वच्छता विभाग, राँची।	- सदस्य
(vii)	प्रधान मुख्य वन संरक्षक, झारखंड, राँची या उनके प्रतिनिधि	- सदस्य
(viii)	सचिव, राजस्व एवं भूमि सुधार विभाग का एक प्रतिनिधि, झारखंड सरकार, राँची।	- सदस्य

इसके अतिरिक्त उपर्युक्त समिति में रेलवे की ओर से निम्नांकित सदस्यों को नामित किया गया है, जो निम्नवत है :-

(i)	मुख्य ब्रिज अभियंता, दक्षिण पूर्व रेलवे गार्डेनरीच, कोलकाता	- सदस्य
(ii)	मुख्य ब्रिज अभियंता, पूर्व रेलवे फेयरली प्लेस, कोलकाता	- सदस्य
(iii)	मुख्य ब्रिज अभियंता, पूर्व मध्य रेलवे, हाजीपुर	- सदस्य
(iv)	उप मुख्य अभियंता (ब्रिज), दक्षिण पूर्व रेलवे गार्डेनरीच, कोलकाता	- सदस्य सचिव

3. रेलवे एवं राज्य सरकार के संबंधित विभागों के बीच समन्वय स्थापित कर विभिन्न संरचनाओं, जो रेल लाईन को प्रभावित करते हैं, का निर्माण, निरीक्षण, संपोषण एवं संचालन हेतु रेलवे से प्राप्त "Manual of Instruction for Railway Affecting Works" को राज्य सरकार द्वारा अंगीकार करने के प्रस्ताव पर मंत्रिपरिषद की स्वीकृति दिनांक 25.08.2014 की बैठक में मद सं0-2 के रूप में प्रदान की गयी है।
4. "Manual of Instruction for Railway Affecting Works" परिशिष्ट-I पर संलग्न है।
5. मैनुअल को अंगीकार करने से राज्य सरकार के विभिन्न कार्य विभागों के पदाधिकारियों एवं रेलवे के पदाधिकारियों के बीच बेहतर समन्वय स्थापित होगा। रेलवे को प्रभावित करने वाले संरचनाओं/कार्यों का संयुक्त निरीक्षण हो सकेगा और किसी प्रकार की आसन्न खतरा से रेलवे को ससमय अवगत कराया जा सकेगा।
6. इसे तत्काल प्रभाव से लागू समझा जाय ।

झारखण्ड राज्यपाल के आदेश से,  
**सुनील कुमार सिन्हा,**  
 संयुक्त सचिव (अभि0)

**MANUAL OF INSTRUCTIONS FOR  
RAILWAY AFFECTING WORKS  
JHARKHAND**

**STATE COMMITTEE OF  
ENGINEERS, JHARKHAND**

OCTOBER, 2006

LIST OF ABBREVIATIONS USED

cM/ S	Cubic metre per second
FSL	Full supply level
FTL	Full tank level
HFL	Highest flood level
k.	Kilometer
m.	Metres
mcM	Million cubic metre
MSL	Mean Sea level
MWL	Maximum Water level
TBL	Tank bund level

## CONTENTS

	<u>Page No.</u>
Preamble	(i)
1. General	1
2. Criteria for and Types of Railway Affecting Works	4
3. Effect on safety of Railway Lines / Bridges	6
4. Inspection & Repairs	9
5. Appendices	11

### PREAMBLE

Railway Affecting Works such as irrigation and water supply tanks or reservoirs, canals in embankment, marginal bund and road embankments with inadequate waterway for drainage situated in the vicinity of the railway line and other works which might alter or impede the natural course or discharge of waterways, may be owned and controlled by multiplicity of agencies e.g., Public Works, Irrigation, Revenue and forest Departments of State Governments, Quasi-Government and local bodies, Private Parties and individuals etc. The failure, improper design, malfunction, improper maintenance or operation or lack of inspection of such works could lead to serious breaches and failure in the Railway embankments and bridges, which can be attended with catastrophic accidents to trains and loss of precious human life, serious and prolonged disruption of Railway traffic as also heavy losses to Railway and other property. No statutory obligations have so far been placed on the owners of Railway Affecting Works, which expose the Railways and the travelling public to great risk.

As a follow up of the discussions between Union Minister of Railways and the Chief Ministers of the States on 5<sup>th</sup> June, 1957, a 'State Committee of Engineers' consisting of senior officers from Railways, Public Works, Irrigation, Revenue, Forests, Local Self Departments of the States concerned has been set up in each State. The functions of these Committees have been laid down in para 4 of the Ministry of Railways letter No. 57/WII/CMT/20 dated 23.6.57 (Appendix III). These Committees have been charged with the responsibility of maintaining up-to-date lists of Railway Affecting Works and bringing about co-ordination between the Railways and the State Authorities in respect of policies and programmes, and for proper up-keep of such works

whether belonging to the States or private agencies.

Recognising the danger posed by the Railway Affecting Works, Khosla Committee of Engineers, which was set up by Government of India, vide Ministry of Railways' Resolution No. E57C01/3(RB1) dated 4<sup>th</sup> March, 1957 (Appendix IV) to go into the design of bridges and other connected matters – recommended, inter alia, as follows:-

- (a) The State Committee of Engineers should prepare a list of and notify all Railway Affecting Works; and arrange for submission of annual reports of inspection, system of watch and the issue of warnings of apprehended and actual breaches of tanks.
- (b) The State Governments should be entrusted with the responsibility for checking up and ensuring the maintenance of all Railway Affecting Works, their watch and issue of warnings.
- (c) The State Irrigation Departments should have the authority to take action against unauthorised excavation of channels from beds of active rivers.
- (d) It should be obligatory for the party constructing a work, which is likely to become Railway affecting to obtain prior approval of the Railway concerned.
- (e) In order that the directions in respect of maintenance and construction of Railway Affecting Works be comprehensive and unified for all States, a Manual of Instructions should be prepared on an all India basis, and the essential requirements of safety, as set forth in this Manual, incorporated in a central statute either as an amendment to the Indian Railway Act or as a separate Act.

The above recommendations were accepted by the Government, Pursuant to the recommendation (e) of the Khosla Committee of Engineers, the present Manual of Instructions for Railway Affecting Works has been compiled by the Research, Designs & Standards Organisation, Ministry of Railways for uniform adoption by all the States and the Railways on an All India basis. The Manual has been drawn up after discussions in various State Committees of Engineers and incorporates the experience gained by the Railways and State Governments for long years in inspection, maintenance, operation and effects of such works. It is hoped that the adoption of the Manual by all concerned would lead to uniform healthy and safe practice for the construction, inspection, maintenance and operation of such works, which greatly mitigate the risk of damage by accidents on Railways due to such works.

Suggestions for improvement in the contents of the Manual are welcome and may be sent to the Director General (Research), Research, Design & Standard Organisation, Ministry of Railways, Government of India, Manaknagar, Lucknow-226011 through the State Committee of Engineers.

# 1

## Chapter - 1

SCOPE.	1. GENERAL
	1.1 This Manual deals with rules, procedures and general practice to be followed for the construction, inspection, maintenance and operation of Railway Affecting Works for uniform adoption all over the country. These may be considered obligatory.
DEFINITION OF RAILWAY AFFECTING WORKS.	1.2 Railway Affecting Works are those, the construction defective design, failure, improper or poor maintenance or operation of which may cause serious damages/breaches or flooding of Railway line or bridge. Examples of such works are:- (i) Irrigation and water supply tanks or reservoirs; (ii) Canals in embankment and river bunds; (iii) Road embankments with inadequate waterway for drainage

- situated upstream or down stream of the railway line;
- (iv) Temporary channels cut for irrigation or other purposes from beds of active rivers; and
  - (v) Other works or operations, which might alter or impede the natural course of flood flow or cause an increase in the volume of such flow. These may be new irrigation projects, new township, new forest belts, large-scale deforestation etc.

**AUTHORITY  
TO DECLARE  
A WORK AS  
RAILWAY  
AFFECTING.**

- 1.3 The concerned Executive Engineer of Water Resources Department or such other authorised officer of other department of State Government shall identify the Railway Affecting Works. The State Government Department shall not be burdened to declare private work as a Railway Affecting Works. In the event of any dispute, the matter will be referred to the State Committee of Engineers subject to final decision by the Chief Engineer of the Railway.

**LIST OF  
RAILWAY  
AFFECTING  
WORKS.**

- 1.4 The Irrigation Department of each State should identify the Railway affecting works in their State. The Chief Engineer/ Irrigation of the State (or an officer of equal rank nominated by the State Government) should maintain lists of such works, review these from time to time and update the list at least once a year before the monsoon. In respect of works owned by quasi- government and local bodies, private institutions and individuals, the list of the works will be called for from the parties concerned, by the nominated Chief Engineer of the State Government who after scrutiny will incorporate such works in the final list. The nominated Chief Engineer of the State Government will send copies of the list at least one month before the onset of the monsoon every year to the State Committee of Engineers, Railway Chief Engineers, Railway Divisional Engineers, Executive Engineers of State Government and other owning bodies. He will also notify the list on behalf of State Committee of Engineers.  
The list of such works shall be prepared in proformas prescribed at Appendix-I (A) to I(L)

2

**NEW RAILWAY  
AFFECTING  
WORKS.**

- 1.5 No new work or modification/ re-modelling of an existing work, which is likely to be classified as railway affecting should be undertaken by any party (including a Govt. deptt ) without getting prior approval of the Railway Administration. For this purpose, the party concerned should apply through Irrigation deptt. to the Railway (Divisional/ Executive) or Chief Engineer concerned along with necessary plans, hydrological data, standards of construction/ specifications, proposed procedure and schedule of inspection, operation and maintenance and the undertaking to follow these procedures and schedules as approved by State Irrigation Deptt. and the Railway. Should the Railway Administration so required, additional- plans, design data or details as requested by them should also be furnished by the party concerned to the Railway.

- 1.6 The proposals of new Railway Affecting Works or modification or remodelling of an existing work shall be placed before the T.A.C. of the State in which Railway Chief Engineer shall be the member to participate in the discussion.
- INSPECTION MAINTENANCE AND OPERATION OF RAILWAY AFFECTING WORKS. 1.7 The parties owning the 'Railway Affecting Works' should regularly inspect and maintain Railway Affecting Works in accordance with the approved procedure and schedule referred to in para 1.5 above and the schedule laid down in Chapter 4 for this purpose, so as to ensure that the works remain in a fit and sound condition. Any repairs or strengthening needed should be carried out with utmost expedition before the onset of the monsoon. The Railways' representative should have access and be given facilities to inspect the works, their maintenance and operation. Any request from the Railway Administration in connection with strengthening, repairs, maintenance or operation of such works to ensure the safety of the Railway lines should also be attended with promptitude. Detailed instructions should be laid down by Executive Engineers of States Government Departments concerned, for operation of such works which should be followed by the parties concerned.
- ACTION IN CASE OF APPREHENDED DANGER. 1.8 In the case of any apprehended danger or actual damage to a Railway work, which might affect the safety of Railway lines, immediate action should be taken by the party concerned to advise Station Master, Divisional Engineer/Executive Engineer and the Chief Engineer of the Railway concerned by telephone and telegram so as to enable Railway officials to take immediate precautionary and other measure to ensure safety of trains and to avoid accidents. For this purpose parties concerned should always keep the addresses and telephone numbers of the Railway officials concerned, available with them.
- 3
- ROLE OF STATE COMMITTEE OF ENGINEERS. 1.9 State Committee of Engineers have an important role to play in the matter of Railway Affecting Works. Their function which have been set forth in Railway Board's letter No. 57/W- II/CMT/20 dated 23.6.57 (copy at Appendix III) are briefly as follows:-
- (a) Exchange of information about scheme envisaged by any one Department and likely to affect the work or safety of assets of any other Department and consequential safeguards to be adopted.
  - (b) Keeping up-to-date the list of Railway Affecting Works, etc. naming the official responsible for joint inspection of each such work immediately after monsoons and, if possible, also in advance of monsoons; and watching that the Department responsible for proper maintenance of such works promptly carries out the necessary repairs.
  - (c) Evolving a procedure for-
    - i) Obtaining and broadcasting, by departments concerned warnings or forecasts of heavy rains,



floods, storms etc. as well as the actual heavy rainfall recorded and expected floods downstream, to the officers concerned in the various Department ; and

- ii) Inducing public co-operation in promptly conveying to the Department concerned any unusual occurrences, e.g, breaches etc.
- (d) Assessing whether waterways, protection works, etc. provided by any Department in an area severely affected by floods have proved to be inadequate and improvements needed for future.
- (e) Co-ordination of related schemes of the various Departments represented. State Committee of Engineers should meet at least twice a year preferably in April and November.

DECLARING A  
SECTION  
VULNERABLE.

- 1.10 Chief Engineer or Divisional Engineer of the Railway concerned shall declare the sections of the Railway that are likely to be affected by non-completion of the urgently required repairs and strengthening or for whatever compelling circumstance as vulnerable and shall make suitable arrangements like patrolling of the section during monsoon and also take other necessary precautions to ensure the safety of the railway line. The Railway official should also take action in this regard as detailed in para 726 and 727 of Indian Railways Permanent Way Manual, extract of which is at Appendix V.

4

Chapter – 2

CRITERIA FOR AND TYPES OF RAILWAY AFFECTING WORKS

GENERAL.

- 2.1 Criteria for identifying the work a Railway Affecting can at best be outlined under broad principle for the guidance of the Engineers. Every case has to be decided on merits taking into account some other factors i.e. local conditions such as location of the Railway Affecting Works whether upstream or downstream of the Railway Line, slope of the ground, extent of discharge in the event of failure of work, capacity of the Railway line to absorb the shock etc. Such criteria can't be laid down on all India basis for every conceivable shape of Railway Affecting Works. Specific cases may be considered by State Committee of Engineers. However, general broad criteria for classification of a few common type of works being treated as Railway Affecting are given in the following paragraphs.

TANKS.

- 2.2
- (i) All tanks within 0.5 Km of the Railway line irrespective of their capacity and having a Full Supply Level higher than the Formation Level of the Railway line.
  - (ii) Tanks within 10Km of Railway line having capacity of 0.05 m.cM and more.
  - (iii) Tank between 10 to 15Km of Railway line having capacity of 0.15 m.cM and more.

- (iv) Tank between 15 and 35 Km of the Railway Line having capacity of 1.5 m.cM or more.
- (v) Tanks with capacities and distances described in items (ii),(iii) and (iv) above, if lying downstream of the Railway line, will be treated as “Railway Affecting” if FTL touches the Railway embankment.
- (vi) Tank through which Railway line passes, having bunds and surplusing works on downstream and liable to cause damage to the Railway line and effect stability of its embankments and bridges due to lowering of the level on account of breach in the bund or escape works and having no proper protection.
- (vii) Tanks through which railway line passes having crest level and surplusing weirs above danger level of the railway bridge and the railway line.
- (viii) Tanks on upstream of railway line having past history of breaches effecting working of the Railways and not re-modelled to mitigate such effects. Tanks located up-stream of the railway line constructed with unsuitable material or having inadequate slope until brought to the desired safe standards.

5

- (ix) A tank or a series of tanks in the catchment of the stream crossing the Railway lines where the catchment area of the stream at crossing point is 250 sq. km. or more and the combined catchment area of the tanks is not less than 5% of the total catchment area of the stream at the crossing point.

#### CANALS & DRANAGE CHANNELS.

- 2.3 Following may be considered as “Railway Affecting” works.
- (i) All channels crossing railway lines having discharge of more than 1.5 cM/ sec. Channels having discharge less than 1.5 cM/ sec if the FSL is 0.30m or more above ground level.
  - (ii) Channels on upstream of the Railway line running parallel or oblique including the drainage works as specified below:-
    - (a) Discharge between 5 to 15 cM/ sec within range of 0.5km from Railway line and FSL being 0.3m or more above ground level.
    - (b) Discharge between 15 to 30 cM/ sec and within range of 1 Km from Railway line and having FSL 0.3m or more above ground level.
 Discharge more than 30 cM/ sec within range of 1.5Km. having FSL 0.3m or more above ground level.

#### ROAD EMBANKMENTS.

- 2.4 Road embankment higher than 3m with bridges, culverts and retaining walls within 1Km. on either side of the Railway line.

#### BUNDS.

- 2.5 The following may be considered as Railway Affecting Works:
- (i) Marginal bunds on upstream or downstream side on one/both banks of the river crossing the Railway line

- (ii) Protection bunds or works for diverting flow from one channel to another or for prevention of flow through defunct channel crossing the Railway line on upstream of the bund or works so constructed.
- DAMS, BARRAGES AND WEIRS. 2.6 Dams, barrages and weirs on stream crossing the Railway line and located on upstream and dams, barrages and weirs on downstream side having HFL higher than the danger level of the Railway bridge.

6

Chapter – 3THE EFFECT ON SAFETY OF RAILWAY LINES/BRIDGES

- TANKS. 3.1 The Tanks may endanger the safety of the Railway line in the following manner :-
- (a) Overflowing of the Tank in the vicinity of the Railway line, particularly when FSL of the Tank is higher than the Formation of the Railway line.
  - (b) In case of Railway line passing through the Tank, having surplusing arrangement on the downstream side, lowering of water level due to failure or breach in the bund or surplusing work may endanger the stability of the Railway embankment.
  - (c) In case of Railway line passing through the Tank, the crest level of surplusing work being higher than the Danger Level of the Railway bridge may cause excessive discharge and scour around the Railway bridge.
  - (d) The series of Tanks with catchment area more than 5% of the total catchment area of the stream at Railway bridge, may endanger the safety of the bridge in case of failure.
- CANAL OR DRAINAGE CHANNEL CROSSING THE RAILWAY LINE. 3.2 The canals /drainage channels may endanger the Railway line:
- (a) By passage of discharge in excess of the designed discharge.
  - (b) By defective regulation on account of closure or opening of regulators or outlets upstream or downstream due to any reason.
  - (c) By keeping open the regulator gates when they are required to remain closed or closed when they are required to remain open, thus allowing additional quantities of water to flow down-stream or to pond up on the upstream of the regulator, thereby causing danger to Railway bridge/embankment.
  - (d) Due to inflow of flood water from the surrounding areas through in-lets, or through cuts made in the canal banks by the villagers, or due to heavy rainfall, where the canal bed is below the general ground level.
  - (e) Due to breach in canal banks on account of any reason.
  - (f) Due to choking of fumes in syphon crossings under the

- Railway track by floating debris carried down the canal.
- (g) Due to failure of canal structures such as falls, regulators, etc.

7

CANALS OR  
DRAINAGE  
CHANNELS  
RUNNING PARALLEL  
OR OBLIQUE TO THE  
RAILWAY LINE.

- 3.3 (a) Canals or drainage channels running parallel or oblique to the Railway line may endanger the Railway line by a breach/cut in its banks, permitting excessive discharge to flow towards the Railway line leading to abnormal afflux on the Railway culverts or threatening stability of Railway embankment.
- (b) Inadequate cross drainage works on such canals or drainage channels may lead to heading up of water on the upstream side which can result in breaches in their banks and subsequent rush of excessive waters towards Railway embankment endangering its safety.

ROAD  
EMBANKMENTS  
WITH OPENINGS/  
SLUICES OR WALLS  
AND SIMILAR  
OBSTRUCTIONS  
WITHIN 1KM. OF  
RAILWAY LINE.

- 3.4 (a) Road embankments and openings therein may prevent axial flow through the Railway bridges by virtue of their locations. Inadequate waterway or insufficient headway in these openings may cause heading up of water or breaches in embankment, thus creating serious situation by sudden rush or accumulated water towards Railway embankments/bridges. Water overtopping the road embankments choking up or neglected maintenance of road culverts may also lead to similar situation.
- (b) A number of factories, land-holdings and small townships have come up in the past and are still growing in number. Consequent upon the incidence of these developments, there has been a tendency of building permanent boundary walls or barriers, on flat terrain, where there are no well-defined channels for the storm water drainage. The storm water in such circumstances would change its course, flow along the boundaries and ultimately may find its way to any other Railway culvert in the vicinity, by passing the one to which it would normally have flowed, had not these obstructions been caused. While such cases may not be large in number or be severe in extent, unless proper note is taken of, and further growth of such obstructions prejudicial to safety is stopped, it would at a later date present a major problem like in other cases, where developments in the past have affected and imperceptibly changed the characteristics of the surroundings and have caused concern now.

MARGINAL BUNDS.

- 3.5 Marginal bunds cause increased discharge in the main river by reduction of valley storage. On the other hand, a breach in the marginal bund can result in the floodwater attacking the Railway line at other locations. Thus improvements as well as damage to the marginal bunds may affect the Railway.

PROTECTION WORKS  
ON RIVERS.

- 3.6 Protective works on rivers like groynes, repelling/deflection spurs, retired bunds are constructed either by State Governments or Railways or jointly by State Government and Railways, for regulating and controlling the flow. Failure of such works can endanger not only the bridge across the river

but also the Railway embankments at other places. A bund built many kilometres upstream of a Railway bridge to seal off the flood water passing in to another spill or drainage channel is not an uncommon feature. Existence of such works is not apparent from the site of the bridge but failure of such works can affect the safety of the Railway line.

#### DAMS, BARRAGES & WEIRS

- 3.7 (i) A Railway bridge located downstream of such works may get affected if the total discharge from the surplus weir and penstocks provided at different levels of the Dams, though designed to allow known discharges for different levels of water at some stage exceeds the discharge which the Railway bridge can cope with.
- (ii) For such barrages and weirs, the principles and rules applicable for canal head works and regulators will generally apply.

#### TEMPORARY CANALS TAKEN FROM RIVERS AND OTHER WORKS

- 3.8 Many times channels are dug out from dry or nearly dry beds of streams or from active rivers to tap and divert the water for irrigation or other purposes. During heavy rains, a large quantity of water may find its way along these channels and flood the adjoining areas, especially near the tail ends of these channels. In such a case, if the general slope of the ground is falling towards the Railway line, it may cause danger to the Railway line in the same way as a canal bursting its bank in the vicinity of the Railway line would.

#### OTHER WORKS

- 3.9 New flood control, drainage and anti-water-logging schemes are planned from time to time for draining out such of the catchments which have either so far not been well drained or where the water has stagnated over the cultivable land for long periods detrimental to agriculture. Similar conditions can be caused by the presence of lakes, ponds and other such natural water-spreads, interspersed in the catchment, the drainage of which is also taken up as a developmental measure. In such cases, with the excavation of drains, the flood flow gets concentrated at the railway embankments where waterways have been provided for the previously known discharges. This would not only affect the bridges or culverts provided for the drain but also the nearby culverts because of inadequate discharging capacity of the drainage on the downstream.

Filling up of creeks and low lands in the vicinity of railway line for developmental works may cause flood water level to rise, which may affect the safety of railway embankment and running of trains.

Chapter – 4INSPECTIONS & REPAIRS

- |                         |  |
|-------------------------|--|
| INSPECTING<br>AUTHORITY | <p>4.1 The Government owned Railway Affecting Works shall be inspected by the Executive Engineer of the Water Resources Department or such other authorised officer or other departments of State Government with in jurisdiction. But works owned by Quasi Government organization, private bodies or individuals should be inspected by Railway Authority. In the event of any disputes with the owners, the case shall be referred to the State T.A.C. for adjudication whose decision shall be final and binding on the parties concerned.</p> <p>4.2 Railway Affecting Works shall be jointly inspected by the Executive Engineer, Water Resources Department or any authorised officer or other departments of State Government and the nominee of the Railway not below the rank of an Assistant Engineer immediately after the monsoon. The report after joint inspection shall be submitted to the Divisional Engineer of Railway Authority. In the event of disagreement on any issue the matter shall be referred to the State T.A.C. for adjudication.</p> |
| INSPECTION<br>SCHEDULE  | <p>4.3 The concerned Executive Engineer of the Water Resources Department or such other authorised officer or other departments of State Government shall inspect every Railway Affecting work in his jurisdiction soon after the monsoon and submit his report to his Head of Department and Chief Engineer/ Irrigation (or equivalent nominated officer of State Government) by the end of January every year. This report should be accompanied by certificate of soundness for the works in good condition and approximate estimate for repairs for those works not considered in sound condition. Two copies of this report will also be sent to the Divisional Engineers of the Railways, who if considered necessary, may bring some important points to the notice of his Chief Engineer.</p>  |
| INSPECTION<br>REPORTS   | <p>4.4 The annual inspection of the Railway affecting works shall be prepared in the prescribed format after joint inspection of Executive Engineer, Water Resources Department or any other authorised officer of other departments of State Government and the representative of Railway.</p> <p>4.5 Proforma for inspection of tanks and road bridges are indicated at appendices II-A and II-B respectively. For other works inspection notes should be recorded every year on separate sheets, covering important points. Divisional Engineer of the Railway will carefully scrutinise the reports received from the Asstt. Engineer of State Government and take note of the works not considered in sound condition. He will then ask his Asstt. Engineer to jointly inspect such works with Asstt. Engineer of the State and</p>   |

- Asstt. Engineer (Rly.) will submit the joint report to the Divisional Engineer. The Divisional Engineer will correspond and request the State Authority concerned to carry out and complete necessary repairs well before the next monsoon.
- TIMELY REPAIRS** 4.6 The concerned State Government authority, Quasi-Government and local bodies, private institutions and individuals as the case may be, will arrange to carry out necessary repairs and complete on priority before next monsoon. They will send the intimation of such repairs to Railways and nominated Chief Engineer of State Government.
- ACTION WHEN REPAIRS NOT DONE IN TIME** 4.7 In case the repairs of the works, which were found in unsound condition are not completed in time for certain compelling circumstances, the nominated Asstt. Engineer of the State Government will advise his Executive Engineer, who shall send a separate list of such cases to the parties as well as the Divisional Engineer of the Railways, with a copy to the nominated Chief Engineer of the State. Arrangements will also be made by the State Government in consultation with Divisional Engineer of the Railway to inform immediately the nearest accessible Railway Station Master and the concerned Asstt. Engineer of the Railway in the event of threatened/ actual mishap. Also, in case of repairs not undertaken or completed for any reason or whatsoever, by the owner of "Railway affecting Works", the Railway will be free to undertake such repair/work within the Railway premises as deemed necessary for safety of the railway line. Execution of such works/repairs and posting of the patrol by the Railway in such cases will be at the cost of the party owing the "Railway Affecting Works".
- 4.8 Where repair and restoration works shall be necessary it will be taken up out of requisite fund to be made available from the custodian department.

APPENDIX-I(A)STANDARD PROFORMA FOR PARTICULARS OF THE EXISTING RAILWAY AFFECTING TANK AND TANK BUNDS.

Note: (i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.

(ii) To be filled by the concerned railway is shown thus: \*

Sl. No.	Description of tank.			Location of tank			
	Name of tanks & tank bunds if any.	Owner-ship	Party responsible for maintenance (address)	Opposite Railway Line Kilometerage	Between Rly. Stations	Direction with regard to Railway line & distance from it in Km.	Nearest village & Tehsil with name & distance in Km.
1.	2.	3.	4.	5.	6.	7.	8

Reference to Plot No. & Settlement Map No. showing location of tank.	Details of tank					
	Average dimensions (Length, Breadth & Depth /height in m.	Height of Embankment above general ground level in m.	Catchment area in sq. km.	Capacity of tank in million Cu.m.	Bed level of tank	Reduced level of top of embankments
9.	10.	11.	12.	13.	14.	15.

Details of tank.			Details of surplusing arrangements.						
Full tank level below top of embankments	Standard of the tank bund		Type of Weir.		Length of weir in m.	Top level of Weir in m.	Total drop	Details of sluice	
	Top width	Side slopes	Masonry/ Earthen	Flank /Central				Type	Discharge in cu.m/ sec
16.	17.	18.	19.	20.	21.	22.	23.	24.	25.

Details of surplusing arrangements			Particulars of embankment, extent and height in m. (Maximum & Average)
Quantity of surplus discharge over weir in cu.m/ sec	Direction of flow of water from tank in case of breach		
	In permanent stream (Name of stream)	Or other streams if so, name of streams	
26	27	27(A)	28

## APPENDIX-I(A) CONTD

Br. No. & Type / Length & No. of spans *	Location (Railway Kilometerage) *	Rail level at bridge in m. *	Bottom level of girder or springing point of Arch *	Type of foundation	Type of flooring or any protection work provided	HFL and floor level or bed level	Highest H.F.L. with year
29	30	31	32	32(A)	32(B)	33	33(A)

P O S T A L					
Name & full postal addresses of local officials to be CONTACTED for joint inspection, if necessary		Name & full postal addresses of local officials for communicating, warning & contacting in emergency		Reason for considering it Railway affecting	Remarks with special reference to past history
Railway *	State	Railway *	State		
34	34(A)	35	35(A)	36	37



**PROFORMA FOR THE PARTICULARS OF ROAD BRIDGES (INCLUDING CAUSEWAYS CULVERTS, ETC.)****1. General:**

- (a) Name of river
- (b) Situation (Name of road & Kilometrage)
- (c) Year of construction
- (d) Cost of bridge.
- (e) Maintenance Agency.
- (f) Name & location of railway bridge/embankment liable to be affected.
- (g) Distance from railway track.
- (h) Rail level with reference to MSL.
- (i) Lowest level of the top of road with reference to MSL.

**2. Structural details of bridge:**

- (a) Type of bridge-plate girder, trussed girder, arch, suspension cantilevers, etc.
- (b) Number & size of spans.
- (c) Class of bridge – I.R.C. ‘AA’ class or ‘A’ class or ‘B’ class loading.
- (d) Width of roadway between the kerbs.
- (e) Materials of construction and details of superstructure & substructure including present condition.
- (f) Nature of soil and subsoils with depths and also depths of foundations.
- (g) Protective works on approaches (hand rails or guard stones).

**3. Bearing Arrangement:**

Type of bearing with brief details:

**4. Protection works (guide-bunds, aprons, etc.) and flood details.**

- 4.1 Description of protection works.
- 4.2 Condition.
- 4.3 Maximum flood level observed.
- 4.4 Maximum scour observed (extent & location)
- 4.5 General remarks on behaviour of river.

**APPENDIX-I(C)****LIST OF RAILWAY AFFECTING WORKS – CANAL CROSSING WITHOUT HEAD WORKS.**

Serial No. of the list circulated	Railway Kilometerage at crossing.	Between stations land name of the Railway Division, Section etc.	Concerned Railway Bridge.	Span type & size of girder
1.	2.	3.	4.	5.

Rail level	Level of bottom of girders or slab or spring of Arch.	F.S.L. (Full Supply Level)	Bed Level	Danger Level (Railway datum.)	Level of top of the canal/channel bund on U/S side
6.	7.	8.	9.	10	11.

Designed discharge	Whether F.S.L. has ever exceeded. If so, year of occurrence.	Extent of damage to bridge & approach banks since its construction	Can the soundness of various works be certified,
12.	13.	14.	15.

If not, repairs to be executed now with approx. estimate	R E M A R K S
16.	17.

APPENDIX-I-D

GENERAL LIST OF RAILWAY AFFECTING WORKS (Other than tank & road bridges)

Sl. No.	Location		Name of Work	Type of Rly. affecting work & proforma in which technical data are detailed.
	District	Tehsil		
1.	2.	3.	4.	5.

Particulars of owning agency	Particulars of Agency for inspection & maintenance	How Railway is affected	Railway Kilometerage likely to be affected
6.	7.	8.	9.

Between Stations Name of Division & Section	Name of the Railway & the address of Divisional/District Engineer to whom it pertains.
10.	11.

(Items 1 to 11 are common for all the Appendices given below i.e. from I (E) to I (L).

APPENDIX-I (E)

**PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS – Canal Crossings with Head Works & approach tanks.**

- Note: (i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.  
(ii) To be filled by the concerned railway is shown thus .....\*

Sl. No. (Same as in the General List)	Railway Kilo- meterage	Between Stations & Name of the Rly.	Type of crossing (Bridge syphon, aqueduct etc.)	Rail Level	Bottom of girder or springing of arch	Design-data	
						Danger level	Discharge
12.	13.	14.	15.	16.	17.	18.	19.

Design-data			Actual maximum at any time in the past					
F.S.L.	Bed Level	Top level of canal Bank on u/S side	Discharge	F.S.L.	Bed level	Water level on D/S side	Water level on u/s side.	Whether permanent or seasonal
20.	21.	22.	23.	24.	25.	26.	27.	28.

History of damages if any	Whether lined		Type of foundation (open, shallow or deep)	Whether flooring or any protection works provided? If so, is it in good order?	Are there any dangerous gulleys in the canal banks, which require immediate repairs?
	Crossing	Approach			
29.	30.	31.	32.	33.	34.

Has the bed of the canal been silted or scoured?	Over flow weir	Head Work and/or Regulators		
	Whether the overflow weir at site is as per the list or not? If exists present conditions? a remarks.	Name of Head works of Regulators within 8 km. U/s or 1.5 Km. D/S	Distance from Railway Bridge	Designed maximum discharge above the Head Works or Regulators
35.	36.	37.	38.	39.

APPENDIX- I(E) Contd.

Head Work and/or Regulators			
Where manned (wholly, partly or unmanned)	Are the regulators & other masonry works in good order without leakage as not to allow excess water in the canal?	When it was checked list & what action was taken on the same?	Expected rise in water level above F.S.L. at the Railway Bridge by inadvertent opening of all the gates of Head works or regulators U/S or closing of all the gates of Head works or regulators D/S
40.	41.	42.	43.

Officers responsible for carrying out joint inspection		Officials for communicating warning & contacting in emergency		Any other data or special remarks	Inspection notes to be submitted each year in separate sheets.
Railway	State	Railway	State		
44.	45.	46.	47.	48.	49.

## APPENDIX-I (F)

**PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS-CANAL  
RUNNING PARALLEL OR OBLIQUE**

- Note:** (i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.  
(ii) To be filled by Railways is shown thus \*

## PERMANENT RECORD

Sl. No. (Same as in General List)	Name of Canal	Distance from Centre Line of Track				
		Classification (main branch, distributaries or field channel)	At its nearest place or crossing *	Corresponding Railway Kilometerage *	At its farthest place *	Corresponding Railway Kilometerage *
12	13	14	15	16	17	18

Top of rail level	R.L. of top of canal banks u/s d/s	Lowest ground level	Designed discharge	Actual maximum discharge during season	Designed F.S.L.	Actual max. F.S.L. Any time in the past	Actual max. F.S.L. in the season
19	20	21	22	23	24	25	26

Top width & side slope of the canal banks	Free board in m.	Length of canal (RD to RD) susceptible for damage in serial order	Cross drainage works in the lengths likely to affect the Railway independently or combined with canal damage	Particulars of cross-drainage work.			
				Size of flood opening or regulated channel	Opposite Rly. Kilometerage	Total water way of such (D works in sq. m)	Approx. discharge & max. discharge
27	28	29	30	31	32	33	34

Head Works and Regulators		Lengths of Railway line (in Railway Kilometerage) vulnerable to attack in Kms.		Particulars or Rly. Bridges likely to be affected *	Particulars of Railway Bridges	
Type of controlling works within 8 km. U/s & 1.5 km. D/s whether manned or un-manned	Distance from Rly. Bridge along canal	From Km.	To Km.		Bridge No. width, type & span *	Kilometerage *
35	36	37	38	39	40	41

APPENDIX- I(F) Contd

Bottom of girder/slab/spring of Arch below *	Type of foundation (Open shallow or deep)	Whether flooring or any protection work provided or not *	Officers responsible for carrying out joint inspection		Officials addresses for communicating warning & contacting in emergency	
			Railway *	State	Railway *	State
42	43	44	45	46	47	48

Any other data or special remarks/ past history	Inspection notes to be submitted each year in separate sheets
49	50

## APPENDIX-I(G)

## PROFORMA OF PARTICULARS F RAILWAY AFFECTING WORKS-

Road embankments in the vicinity of Railway line

Note: i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.

ii)\* Column will be filled by Railways .

Sl. No. (Same as in the General list)	Name & Classification (NH, SH, Local road)	Name of river	Distance from centre of Railway track			
			Railway kilometerage & between stations	At its nearest place of crossing	At its farthest point at Railway kilometerage	Length of road susceptible to damage
12	13	14	15	16	17	18

Lowest level of the top of road	Highest level of the top of road	Height of Rail embankment (R.L or from G.L) *	Details of cross drainage works or culverts in road	Particulars of each cross drainage work or culverts in road		
				Br. No. type & Span	Road Kilomete rage/ corresponding Rail Kms.	Br. Girder/ Slab or Arch
19	20	21	22	23	24	25

Total waterway of such cross drainage works, in Sq.m.	Lengths of Railway line (in Railway Kms) Vulnerable opposite to each such road drainage *	Railway bridges likely to be affected with section and between stations *
26	27	28

Particulars of such Railway bridges			Total waterway of each bridge in M *	H.F.L for each bridge in m *
Br. No. Type and span *	Kilometerage *	Br. Girder/ slab/ Arch		
29	30	31	32	33

Danger level	Type of foundation (open, shallow or deep)	Whether flooring or any protection work provided or not ?	Officers responsible for carrying out joint inspection	
			Railway *	State
34	35	36	37	38

Officials for communicating, warning & contacting in emergency		Special Remarks	Inspection notes to be submitted each year in separate sheets
Railway *	State		
39	40	41	42

APPENDIX-I (H)PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS – Marginal Bund

Note: (i) All levels should be given either in reduced M.S.L. or with respect to rail level at the Bridge affected

(ii) To be filled by Railways as shown thus\*

Sl. No. (as in the General List)	Name of bund/works	Name of river & bank (left/right)	Location		Distance from Rly. line (km.)	Purpose of the bund	Construction agency
			District	Tehsill			
12	13	14	15	16	17	18	19

Maintenance Agency	Salient features of the work						
	Extent of the bund.	Dangerous length, breadth & height (m)	Crest level at or near the Bridge site	Direction of flow of water from the bund in case of its breach	Min. designed free Board	Particulars of escape drainage.	Past history if any
20	21	22	23	24	25	26	27

Particulars of Railway Affected Bridge							
Particulars of Rly. track vulnerable to attack in the event of damage to the bund (Length in Railway Kilometerage)*	Bridge No. *	Location Rly. Kilometerage *	Waterway	Bottom of girder/slab or spring of arch in (m) *	Danger Level *	Observed HFL with year *	Type of foundation (Open, shallow or deep) *
29		30	31	32	33	34	35

Whether flooring of any protection provided or not *	Past history if any *	Address of Officers				Reasons for considering it Railway affecting *	Any other data or special remarks *	Inspection notes to be submitted each year in separate sheets*
		Officials responsible for carrying out joint inspection		Officials for communicating warning & contacting in emergency				
		Rly. *	State	Rly. *	State			
36	37	38	39	40	41	42	43	44

## APPENDIX – I (I)

**PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS** River protection works and Training Works

\*To be filled by Railways

Sl. No. (Same as in General List)	Name of the work like spill bund, retired bunds etc.	Location		Location with respect to a known point on the Rly. line either by bearing or by offset.	Between stations & name of the Rly. & Sections
		District	Tehsil		
12	13	14	15	16	17

Approx. length & Height of the bund	Top level of the bund	Purpose of the bund	How damage to these works affect the Rly ? *	Lengths of the Rly. line (Rly. Kilometrage) vulnerable to attack *	Rly. bridges likely to be affected	Rly. Kilometrage of each such bridge
18	19	20	21	22	23	24

Waterway of each such bridge	HFL of each such bridge in the year *	Danger level *	Type of foundation (Open, shallow, Deep) *	Whether flooring or any protection work provided *	Officers responsible for carrying out joint inspection	
					Railway *	State
25	26	27	28	29	30	31

Officials for communicating warning & contacting in emergency		Reasons for considering in Railway affecting	Any past history or special remarks	Inspection notes to be submitted each year in separate sheets
Railway *	State			
32	33	34	35	36

OF PARTICULARS OF RAILWAY AFFECTING WORKS-

## Dams, Barrages, Weirs and Regulators

Note : \*Column will be filled by Railways shown thus \*

Sl. No. (Same as in General List)	Description of Works				
	Name of Dam, Barrage or Weir or Regulator	Name of river	Purpose of Dam, Barrage or Weir or Regulator	Ownership (Department)	Construction agency
12	13	14	15	16	17

Location				
Party responsible for maintenance	Opposite Rly. Kilometerage	Between Rly. stations & name of the Rly. with section	Distance from the Rly. bridge along the river	Nearest village and Tehsil
18	19	20	21	22

Details of the Dam, Barrage or Weir or Regulator

Dimensions (Length, Breadth & Depth/height)	Capacity of Dam, Barrage or Weir or Regulator	Bed Level of Dam or Barrage or Weir or Regulator on down stream side	Reduced level of top of –Dam or Barrage or Weir or Regulator	Reduced level of full storage level of Dam, Barrage or Weir or Regulator
23	24	25	26	27

Reduced levels of pen-stock outlets at different levels.	Designed discharges at each set of pen- stock working at a time	Crest levels of different spillways and Waste weirs or sluice gates	Designed discharge of each spill ways or sluice gate or other arrangements.
28	29	30	31

Total combined discharges of both penstocks & spills at different levels working at one time	Any reduction in discharges in Col. 29 between the work & the bridge due to canals taking off etc.	Direction of flow of water in case of breach/failure	Minimum designed free board
32	33	34	35



## APPENDIX- I(J) Contd.

Rly. bridge No. Span type *	Rly. Kilo meterage *	Waterway *	H.F.L. *	Danger level *	Bottom of girder/ slab/ spring point of Arch below top of Rail level *	Type of foundation Open, shallow/ or deep *	Whether flooring or any protectio n work provided or not & RL if provided name of the type
36	37	38	39	40	41	42	43

Officials responsible for carrying out joint inspection		Officials for communications warning and contacting in emergency		Reasons for considering it Rly. affecting	Spl. remarks	Inspection notes to be submitted each year in separate sheet
Rly.	State	Rly.	State			
44	45	46	47	48	49	50

## APENDIX I (K)

PRFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS-

## Temporary Channels

(Cut from the bed of streams and tail ends of distributaries)

Note: I) Columns will be filled by Railways.

No. (Same as in the General List)	Name of river	Name & type of work	Location of the channel (Nil) Tehsil/ District	Opposite Railway Kilo meterage *	Between stations section & Railways *	Name of owner & address	Descriptive nature of obstruction
12	13	14	15	16	17	18	19

Railway Kilometerage likely to be affected *	Bridges or culverts likely to be affected *	Whether there is any outfall away from the place of attack or not ?	Any other part of the Railway track likely to be affected in Rly. Kilometerage ?
20	21	22	23

Officers responsible for carrying out joint inspection		Officials for communicating warning and contacting in emergency		Reasons for considering it Railway Affecting *
Railway *	State	Railway *	State	
24	25	26	27	28

Special Remarks	Inspection note to be submitted each year in separate sheet
29	30

APPENDIX I(L)

PRFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS-(For Works like long solid Walls, Barriers, Townships, New Drainage scheme etc.)

Note: i) All levels should be given either in reduced M.S.L. or with respect to Rail level at the bridge affected.

(iii) Column will be filled by railways.

Sl. No. (Same as in the General List)	Name & type of work	Location, District & Tehsil	Opposite Railway Kilometerage	Between Station sections & Railway	Name of owner (Govt. Quasi- Govt. Individuals etc.)
12	13	14	15	16	17

Construction agency	Maintenance agency	Details of obstruction	Rly. bridges & culverts by passed if any *	Rly. Kilometerage *	Waterway in Sq.m.
18	19	20	21	22	23

Railway bridges & culvert flooded *	Rly. Kilometerage *	Waterway of each bridge/ culvert	Approximate discharge due to disturbance in natural flow	Any other part of the Railway line likely to be affected in Rly. Kilometerage *
24	25	26	27	28

Officers responsible for carrying out joint inspection		Officials for communicating warning & contacting in emergency		Reasons for considering it Railway affecting	Special remarks	Inspection notes to be submitted each year in separate sheets
Railway *	State	Railway *	State			
29	30	31	32	33	34	35

**PROFORMA FOR THE ANNUAL INSPECTION OF RAILWAY AFFECTING  
TANKS**

1. Sr. No. of Register/Sr. No. of the notified list
2. District
3. Village and Tehsil and P.S.
4. Name of Tank, dam, local name if any, or bonded water course.
5. Number on the district map of Railway affecting tanks.
6. Sr. No. in list of Railway Affecting Tank
7. Agency responsible for maintenance, viz, P.W.D, Irrigation, Agriculture or Private etc.
8. Railway line/bridge affected, Kilometerage & between stations.
9. Railway Kilometerage of crossing of surplus course of the tank or watercourse.
10. Date of present inspection
11. Name and designation of inspecting officer.
12. Bund
  - (a) Standards of the tank bund as per the Railway affecting tank list.
  - (b) Are there T.B.L. stones or other permanent marks to verify whether top of bund is at prescribed level or not ?
  - (c) Is the top of bund anywhere below prescribed level ? If so, specify changes and shortage in height.
  - (d) Are the top width and the slopes according to standards everywhere ? Specify location where width is less and indicate extent by which it is less.
  - (e) Are there any dangerous gulleys and /or cart-track ruts etc. which must be repaired urgently ? If so, specify locations.
  - (f) Any seepage noticed or reported during the year.
  - (g) Whether the bund is constructed with the suitable material and proper slopes ?
  - (h) Action taken to rectify defects noted in (b) to (g) above.
  - (i) Progress of work if any on hand and the probable date of completion of the work.
13. Surplus Weirs
  - a) Length of surplus weirs as per the Railway Affecting Tank list.
  - b) Whether the surplus weirs at the site are as per the list or not ? Specify the variations if any.
  - c) Whether the M.W.L has exceeded or anything has happened to indicate that the surplus weirs are inadequate or made imperative by forming bunds in front, etc.
  - d) If so, the remedial measures contemplated and action taken.
14. Sluice and other masonry works  
Are the sluices and other masonry works in good order as not to endanger the safety of the bunds ?
15. Special remarks, if any, by the Inspecting Officer.
16. When was this last test check done by A.E./SDO and what action taken on the same?

APPENDIX-II(A) contd.

17. Condition of spill channel.

18. General Remarks

Is the maintenance of the work satisfactory so as to ensure the safety of the railway line / track? If not, state the remedial measures necessary and probable date of completion of repairs with approximate cost.

Signature

Name in Block letters

Date:

Designation

Department.

## APPENDIX- II (B) PROFORMA

## FOR ANNUAL INSPECTION OF ROAD BRIDGES (INCLUDING CULVERTS, CAUSEWAYS ETC)

DIVISION ..... SUB-DIVISION.....SECTION.....

REPORT ON THE CONDITION OF AND REPAIRS DONE TO ROAD BRIDGES, CAUSEWAYS AND CULVERTS, ETC. DURING .....

Sl No. of Bridge	Item No. of the list of notified railway affecting works for the state of *	Situation (Name of road and kilome-terage) *	Corresponding railway kilome-terage. *	Between stations & name of the rail-way division, section etc.*	Class of bridge (I.R.C.'A' class or "A" class or 'B' class loading	No. & size of spans. *
1	2	3	4	5	6	7

Type of bridge (plate girder, trussed girder, arch, suspension, cantilever etc.) and nature of materials and full particulars of superstructure and sub-structure Ref. to Drg. No.	Nature of soil and sub-soil with depths and also depths of foundations. *	Are there any cracks or any other defects noticed in the sub-structure & superstructure?	If so, what steps are proposed?
8	9	10	11

What was the max. flood level last marked over Rly. track affected. If so, has it been repaired to the original formation level and C.S.	Are the bridge flooring and aprons in good condition?	Is the river on the up & down stream side of the bridge having regime flow?	Is the M.F.L. of previous years noted on the Bridge ? Give the MFL. *
12	13	14	15

Is any scour observed in the vicinity of the bridge and if so, to what depth below bed level?	If not Approx. nature cost of repairs to be executed now	Approx. cost of repair	Can the soundness of the works (in good condition) be certified ?	Date, initials and designation of the officer inspecting.
16	17	18	19	20

APPENDIX- II (B) contd.

General remarks on load, and speed restrictions etc. if any to be noted	Officers responsible for carrying out joint inspection	
	Railway @	Owner *
21	22	23

Officials for communicating warning and for contacting in emergency	
Railway @	Owner *
24	25

- Note:- 1) Plans, cross sections and longitudinal sections of the railway affecting work is to be furnished by the SDO/Assistant Engineer to the railway Divisional Engineer in the first year and changes if any are to be intimated in subsequent years.
- 2) All levels should be given either in reduced M.S.L. or with respect to rail levels at the bridge affected.
- 3) Columns to be filled by Railway - @  
Columns to be filled by Owner- \*

Columns not filled should be filled during / after inspection.

31

APPENDIX III

(Copy)

Government of India  
Ministry of Railways  
(Railway Board)

No: 57/W-II/CMT/20

New Delhi dated 22<sup>nd</sup>/23<sup>rd</sup>  
June, 1957

To,  
The General Managers  
All Indian Railways

Sub: Appointment of a Committee of Engineers P.W.D., Irrigation and Railways etc., for Railway Affecting and other Public Works.

The above subject was discussed at the conference of the Chief Ministers with the Railway Minister on 5<sup>th</sup> June, 1957.

- The attention of the Chief Ministers was invited to the fact that a number of works had been and are being carried out in the states, such as Irrigation schemes, repairing or abandoning of bunds and tanks and deforestation of large areas, which affect the safety of Railway track and bridges but no intimation of this activity is given to Railway Administration. These works may considerably change the pattern of flow of floodwaters across the Railway line. Some of the individual Railway bridges designed for the original conditions may in the new circumstances be found inadequate. If such works are located at some distance from the Railway, the Railway Administrations have no means of knowing anything about them. In the interest of safety of Railways, it is imperative that Railway

Authorities are kept in touch with the broad details and progress of such works by the Authorities concerned so that steps to ensure safety of track, etc. if necessary, could be taken in time.

3. There was unanimity of opinion that close co-ordination between Railways and Civil Authorities was desirable. The State Governments offered full co-operation. The consensus of opinion of the conference was that for each state there should be a Committee consisting of senior officers from the Railway(s) and Public Works, Irrigation, Forest and Local Self Government Departments of the State Governments who should periodically review the position of flood affecting works. If any work proposed by one Department was likely to affect another, it should have the prior approval of this Committee.
4. This Committee will frame their own procedural rules but it is suggested that the Committees should hold meetings at pre-determined intervals. Generally speaking, the functions might include:-
  - (a) Exchange of information about schemes envisaged by any one Department and likely to affect the working or safety of assets of another Department and consequential safeguards to be adopted.

Keeping up to date the list of railway affecting works, etc. naming the officials responsible for joint inspection of each such work immediately after monsoons and, if possible, also in advance of monsoons; and watching that the department responsible for proper maintenance of such works promptly carries out the necessary repairs.

#### APPENDIX III contd.

(c) Evolving a procedure for:

- (i) Obtaining and broadcasting, by departments concerned, warnings or forecasts of heavy rains, floods, storms, etc. as well as the actual heavy rainfall recorded and expected floods downstream, to the officers concerned in the various Departments; and
- (ii) including public co-operation in promptly conveying to the Department concerned any unusual occurrence, e.g, breaches tanks etc.
- (d) Assessing whether waterways, protection works, etc. provided by any Department in an area severely affected by floods have proved to be inadequate and improvements needed for future.
- (e) Co-ordination of related schemes of the various Departments represented.

It would thus be seen that these Committee are principally concerned with safety aspect of Railway working and also the safety of other Public Works affected by Railway track, bridges etc.

5. Will the General Managers now kindly get in touch with the State Governments concerned immediately so that these Committees are constituted and start functioning very early. The Railway Board would like to be kept informed about the progress made. A copy of this letter has been endorsed to the Chief Secretaries of State Governments.

DA/Extra three copies of the letter

Sd/- H.D. AWASTHY  
Director, Civil Engineering  
Railway Board

(Copied from pages 55-56 'Report of the Committee of Engineers- October, 1959)



Appendix-IV

Government of India  
Ministry of Railways  
(Railway Board)

New Delhi

the 4<sup>th</sup> March. 1957

RESOLUTION

No. E57C01/3(RB1). A large number of bridges including their protection works were designed and constructed in this country in the latter half of the last century on the basis of technical knowledge and with the data then available. Hydraulic Science and technical knowledge in this sphere have since advanced considerably and further data has become available. It would, therefore, be profitable at this stage to review the designs of bridges in the light of the latest knowledge and experience gained and to indicate the standards which should generally guide the design of new bridges in future. With this object in view, it has been decided to set up a Committee of Engineers to investigate and review the methods of estimating the maximum flood discharge from catchment areas in order to determine the waterway etc. and other connected works required in connection with the design of bridges.

2. The Committee will consists of:

- (i) Shri A.N. Khosla, Vice Chancellor, Roorkee University- Chairman
- (ii) Major-General R.E. Aserappa, Engineer-in-Chief, Ministry of Defence- Member
- (iii) Shri N.K. Roy, Additional Member (Works), Railway Board- Member
- (iv) Shri H.P. Sinha, Consulting Engineer (Roads), Ministry of Transport- Member
- (v) Shri D.R. Mehta, Chief Engineer, Central Water & Power Commission- Member
- (vi) Shri B.C. Ganguly, Jt. Director Civil Engineering, Railway Board - Secretary

3. The Chairman and the members of the Committee will do this work in addition to their existing duties.

4. The terms of reference of the Committee are as follows:

- i) To indicate for different regions the method of determining the maximum discharge to design the waterway for bridges. In places where empirical formulae are recommended to be used, the value of constants to be prescribed for guidance;
- ii) To indicate the general principles for determining the extent of bed scour for the design of foundations and the design of training works, the extent of afflux to be permitted at bridge openings for the peak discharge, the minimum free board for various types and sizes of bridges and waterways to be provided; and
- iii) To indicate measures to ensure safety of Railway bridges against failure of various 'Railway Affecting' works like tanks, canals etc.

5. The Committee will, if necessary, co-opt as members any other Engineers with knowledge and practical experience of construction and maintenance of bridges.

6. The Committee will endeavour to submit their report within six months.

-----

Appendix-IV contd.

ORDERED that a copy of this Resolution be communicated to the Chairman, and Members of the Committee referred to above, the Private and Military Secretaries to the President, the Prime Minister's Secretariat, the Cabinet Secretariat, the Planning Commission, the Ministries of Govt. of India, all the State Governments in India and all Indian Railways.

ORDERED also that the Resolution be published in the Gazette of India for general information.

Sd/- D.C. Baijal  
Secretary, Railway Board.

APPENDIX-VExtract from Indian Railways Permanent Way Manual

**726. Railway Affecting Works (including Railway Affecting Tanks) –** (1) Definition-The term “Railway Affecting Work” may broadly be taken to mean any work which if not constructed and maintained properly, or not operated properly may result in danger to Railway Line (bridge/ embankment). This may include tanks, storage works, canals, bunds, etc.

(2) Register of Railway Affecting Works - The Divisional Engineer/ Assistant Engineer will maintain an up-to-date list of Railway Affecting Works as jointly approved by the Railway and the State Government. The list shall invariably show the particulars of State Authority responsible for maintenance of each Railway Affecting Work.

(3) Inspection of Railway Affecting Tanks – Where as per current practice the Public Works or Revenue Department forwards to the Divisional Engineer every year, their inspection reports on the condition of these tanks which are classified as Railway Affecting, action should be taken as follows:-

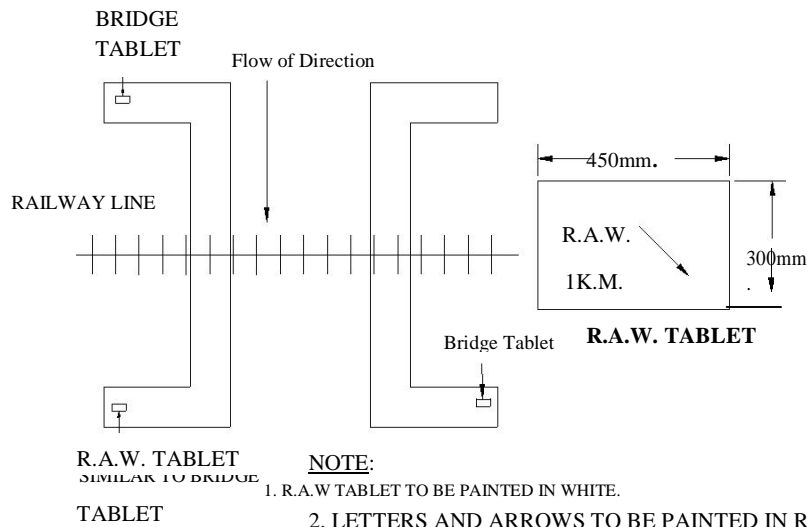
- (a) The Divisional Engineer should peruse the reports carefully and mark those tanks which he considers are not in satisfactory state of repair. He should then forward the reports to the Assistant Engineer with instructions that the tanks so marked should be inspected and reported on.
- (b) The Assistant Engineer should inspect those tanks and report to the Divisional Engineer details of the action being taken by the Public Works or Revenue Department. The Divisional Engineer should prevail on the authorities concerned to carry out all necessary repairs before the ensuing monsoon.
- (c) Copies of the inspection notes of “Railway Affecting” tanks as received from the Public Works or Revenue Department with particulars of date of inspection and notes of action taken or proposed by him should be included in the Register of Railway Affecting Works maintained by the Assistant Engineer.

**727. Vigilance over Railway Affecting Tanks during heavy rains –** (1) The Divisional Engineer and the Assistant Engineer should arrange with the Local Authorities/ village headmen in whose jurisdiction “Railway Affecting” tanks are situated to watch them during periods of heavy rain and give timely intimation to the nearest Station Master, if there is likelihood of any tank failing. The Station Master will telephone/ telegraph reports received from village Headmen to the Permanent Way Inspector, Assistant Engineer and Divisional Engineer.

(2) When the Railway line is threatened, the Assistant Engineer and Permanent Way Inspector shall take adequate steps to ensure the safety of Railway property and staff and arrange patrolling of the line and or post Watchmen with necessary equipment at the place or places threatened and advise the Divisional Engineer accordingly.

(3) All the Bridges which are likely to be affected by Railway Affecting Tanks or other storage works should be provided with a tablet on top of one of the parapets, with the letters RAW engraved on it, followed by an arrow mark pointing in the direction of the Railway Affecting storage work in question.

A typical sketch of R.A.W. tablet is shown below-



## DETAILS OF "RAILWAY AFFECTING WORKS " TABLET(R.A.W.)

(4) If the bridge in whose catchment a Railway Affecting tank is located is classified as a vulnerable location, stationary watchmen should be posted during monsoon. If for any reason, repairs as envisaged during the inspection, as per para 726(3) is not carried out, the section of the Railway line likely to be affected should be considered as vulnerable and watchman as considered necessary posted.

.....

-----